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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/855,235	05/14/2001	John C. Hall	PD-990135/11508	9032

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EXAMINER
CHANEY, CAROL DIANE

ART UNIT	PAPER NUMBER
1745	3

DATE MAILED: 04/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/855,235	HALL ET AL.	
	Examiner	Art Unit	
	Carol Chaney	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 May 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Objections

Claims 1 and 11 are objected to because of the following informalities: In claim 1, line 7, it is unclear if "... Schottky diode connected between the anode and the cathode." refers to the anode and cathode of the same cell, or the anode of the first cell and the cathode of the second cell. Based upon applicants' Figure 2, the claims have been examined with each cell having a diode connected between its anode and cathode.

Line 2 of claim 11 recites "a combination of elements selected from the group..." However, the group recites compounds rather than elements. The claim has been examined assuming the intended meaning of the phrase is "a combination of compounds selected from the group...". This interpretation renders the phrase "and combinations thereof." in line 7 of the claim redundant. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6, 8, 9, and 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al., US Patent 6,193,946 in view of Young, US Patent 5622789.

Kawano et al. disclose spirally wound lithium non-aqueous batteries (Fig. 1 and column 6, lines 51-61.) The cathode active materials are lithium composite oxides, and $LiNi_{1-x-y}Co_xAl_yO_2$ is a preferable material. (Column 4, lines 7-10.) A preferred anode material is graphite. (Column 5, lines 55-57.) A preferred anode contains a copper current collector, and a preferred cathode contains an aluminum current collector. (Column 7, lines 7-22.) Preferred electrolytes contain a lithium salt and organic carbonate solvents. (Column 7, lines 33-36.)

The disclosure of Kawano et al. differs from applicants invention in that Kawano et al. do not disclose at least two electrically interconnected cells with a Schottky diode connected between the anode and cathode. Young discloses a battery pack in which each cell includes a Schottky diode between the battery terminals. (See Figure 3.) The battery circuitry disclosed by Young is appropriate for a variety of battery types, including lithium ion batteries. (Column 4, lines 26-28.) The battery circuitry allows the state of the battery to be made externally available, and can avoid unbalanced cells in a pack, thus preventing cell reversals. (Column 8, lines 10-13 and 28-33.) Therefore, it would have been obvious to one of ordinary skill in the art to use the battery pack and circuitry disclosed by Young with the cells disclosed by Kawano et al. in order to prevent cell reversals and to make the states of the batteries externally available.

Claims 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawano et al. in view of Young as applied to claim 1 above, and further in view of Okada et al., US Patent 6,027,836.

Kawano et al. in view of Young disclose applicants' invention essentially as claimed, with the exception that Kawano et al. and Young do not disclose a microporous polyvinylidene fluoride (PVDF) separator and do not disclose prismatic batteries. Okada et al. teach prismatic lithium ion batteries having microporous PVDF separators. (Column 5, lines 44-49.) The prismatic microporous PVDF separators are shown to have superior discharge capacity compared with batteries having conventional polyolefin separators. (Column 6, lines 20-29.) Therefore, it would have been obvious to one of ordinary skill in the art to use the microporous PVDF separator disclosed by Okada et al. in the battery disclosed by Kawano et al. in order to improve discharge capacity. It would have been obvious to one of ordinary skill in the art to form a battery having a microporous PVDF separator as a prismatic battery because this is the battery shape taught by Okada et al. for use with the microporous PVDF separators.

Claims 1, 2, 3, 5, 6, 8, 9, 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al., US Patent 6,428,930. in view of Young, US Patent 5,622,789.

Maeda et al. disclose spirally-wound lithium secondary batteries which include an anode of carbon active material pasted on a copper current collector and a cathode having a mixture of lithium metal oxides with an aluminum current collector. (Column 5,

lines 7-38.) In a specific embodiment, the cathode active material is a mixture of $LiNiO_2$ and $LiCo_{0.5}Ni_{0.5}O_2$. (Column 7, line 9.) The electrolyte is a lithium salt dissolved in a mixture of organic carbonates. (Column 5, lines 40-45.)

The disclosure of Maeda et al. differs from applicants invention in that Maeda et al. do not disclose at least two electrically interconnected cells with a Schottky diode connected between the anode and cathode. Young discloses a battery pack in which each cell includes a Schottky diode between the battery terminals. (See Figure 3.) The battery circuitry disclosed by Young is appropriate for a variety of battery types, including lithium ion batteries. (Column 4, lines 26-28.) The battery circuitry allows the state of the battery to be made externally available, and can avoid unbalanced cells in a pack, thus preventing cell reversals. (Column 8, lines 10-13 and 28-33.) Therefore, it would have been obvious to one of ordinary skill in the art to use the battery pack and circuitry disclosed by Young with the cells disclosed by Maeda et al. in order to prevent cell reversals and to make the states of the batteries externally available.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rogers et al., US Patent 6,087,035 and Yu, US Patent 5,683,827 disclose battery packs which include diodes in parallel with batteries arranged in series.

Peres et al. disclose modified lithium metal oxides as lithium battery cathode materials.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carol Chaney whose telephone number is (703) 305-3777. The examiner can normally be reached on Mon - Fri 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 703-308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Carol Chaney
Primary Examiner
Art Unit 1745

cc
April 4, 2003